INSTALLATION INSTRUCTIONS

Programmable MC-4 Ignition Control
PN 4224

Parts Included:

1 - MC-4	1 - Pro-Data+ CD	5 - Ring Terminals	4 - Female Deutsch Terminals
4 - Mounting Screws	2 - 3 Amp Fuses	10 - Butt Splices	2 - Diodes
7 - Wire Ties	1 - Wire Harness	5 - Male Fastons	1 - 4" Heat Shrink
5 - Wire Caps	1 - Diode	5 - Female Fastons	

WARNING: During installation, disconnect the battery cables. When disconnecting the battery always remove the Negative cable first and install it last.

Note: Solid Core spark plug wires cannot be used with the MC-4 Ignition. We recommend only the MSD 8.5mm Super Conductor Wires. A 4-Cylinder Universal Kit is available as PN 31449.

OPERATION

DIGITAL OPERATION
The Programmable MC-4 uses a high speed RISC microcontroller to control the ignition's output while constantly analyzing the various inputs such as supply voltage, trigger signals and rpm. The high speed controller can make extremely quick compensations to the timing and rpm limits while maintaining accurate timing signals to within +/- 0.1° and +/- 10 rpm. The circuits and controller of the MC-4 have been thoroughly debounced and suppressed to create protection against Electro Magnetic Interference (EMI).
Note: The MC-4 can be removed from power and still retain its programmed settings.

CAPACITIVE DISCHARGE
The MC-4 features a capacitive discharge ignition design. The majority of stock and aftermarket ignition systems are inductive ignitions. In an inductive ignition, the coil must store energy and step up the supplied voltage to maximum strength between each firing. At higher rpm, since there is less time to charge the coil to full capacity, the secondary voltage falls short of reaching its maximum energy level which results in a loss of power or a top end miss.
The MC-4 Ignition features a capacitor which is quickly charged to 490 - 505 volts and stores this energy until the ignition is triggered. With the CD design, the voltage sent to the coil is always at maximum power even at high rpm.

MULTIPLE SPARKS
The MC-4 produces full power multiple sparks for each firing of a plug. The number of multiple sparks that occur decreases as rpm increases, however the spark series always lasts for 20° of crankshaft rotation. Above 3,300 rpm there is simply not enough time to fire the spark plug more than once, so there is only one full power spark.

PROTECTION
The Programmable MC-4 has a built in reverse polarity protection circuit. This will protect the ignition in the event of wrong connections. It will also shut off for protection from a surge in power. The ignition will still operate once the surge or polarity is corrected.

LED INDICATOR
There is an LED that monitors the status of the Ignition. The LED will verify trigger inputs and will flash trouble codes such as a Code 2 for No Cam Sync or Code 3 for Low Battery supply voltage.

SHIFT COUNTING
The MC-4 uses state of the art computer circuitry to determine when a shift has occurred. This eliminates having to wire in separate external switches. The MC-4 will sense the normal rpm drop of the engine to determine that a shift has been made. The rpm drop is programmable so it can be matched to the specific engine combination being used. In addition the engine rpm has to increase by 200 rpm before the next gear can be selected to prevent double shifting.

CAMSHAFT SYNCHRONIZATION

This is used only in applications where the individual cylinder timing is going to be used. The 2-pin connector with a Light Blue and Light Green wire (Figure 1) connects to a sensor that is used to synchronize or alert the Ignition as to when the number one cylinder is going to be triggered. With this information, the Ignition knows which cylinder is being fired allowing for the individual cylinder timing capabilities. A Universal Cam Sensor is available from MSD as PN 2346.

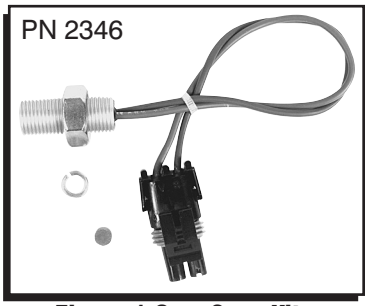


Figure 1 Cam Sync Kit.

Note: This is an option and does not have to be used.
Note: One cylinder or two cylinder Non Waste Spark Systems Do Not require this sensor.

PROGRAMMABLE FEATURES

The Programmable MC-4 Ignition has many features that give you more control over your timing and rev limits. For more information on programming these features, consult the supplied Programming Instruction located on page 12 of these instructions, or see the Help menu in the Pro-Data+ Software.

Figure 2

OPTIONAL HAND HELD PROGRAMMER, PN 7550

The Hand Held Programmer (Figure 2) allows you to select and program the different features of the Programmable MC-4 Ignition. The MC-4 does not need to be connected to the programmer in order to operate because the program values are stored in an erasable memory circuit in the Ignition Control. The Programmer only needs to be connected when you want to check or change programs or to monitor different operating parameters. It connects to the Ignition with a six foot harness with a molded 9-pin connector.

LAUNCH SELECTOR/SHIFT LIGHT WITH GEAR INDICATOR

This Module (Figure 3), PN 4360, connects to the Ignition through the 9-pin harness and allows the driver an instant way to change the Launch Rev Limit settings. There are two rotary dials that control the launch rpm only and are adjustable from 3,000 – 12,500 in 100 rpm increments. There is also an LED that indicates communication and power from the MC-4 Ignition. A 2-pin connector allows operation of the ultra bright LED shift light when connected to the MC-4. Also, the launch wire is monitored on the Gear 1 LED.

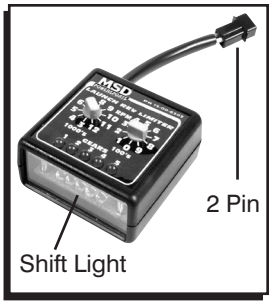


Figure 3

PRO-DATA+ (INCLUDED)

MSD has a software package for your PC that allows you to create timing and rpm programs for this ignition. All of the adjustable parameters can be reviewed and set, then uploaded to the ignition. This software program is included to allow the upload and download of programs for the Ignition Control as well as monitoring and editing of all the ignition's parameters. It will work with any PC running Windows ’95, '98 or NT. More information is available in the Programming instructions located on page 12 of these instructions. Visit our website to download the current version at www.msdpowersports.com.

CYLINDER SELECTION

The Ignition default is for 4-cylinder operation. It can also be programmed for 1 and 2-cylinder operation in the CylCnt menu on the Hand Held Programmer, or through the MSD Pro-Data+ Software.

RPM FEATURES

3-STEP REV CONTROL

The Programmable MC-4 uses a unique "Smart Touch™" Circuitry that learns the exact firing distance from one cylinder to the next to ensure the rev limiters are the smoothest available. The Smart Touch™ rev limiter will learn the small difference between each cylinder as well as large differences such as the Harley engines.

You can set three different rev limits that can be used during the burnout, launch and as overrev protection. Each limit is adjustable in 100 rpm increments from 2,000 – 15,000.

The different stages are selected by the Light Blue and Dark Blue wires. When 12 volts are supplied to the Light Blue wire, the Burnout limit is activated. Twelve volts on the Dark Blue wire activates the Launch rev limit (as well as the Launch Retard value, resets to Gear 1 indicator and timing curve). When 12 volts are removed from both wires, the overrev limit is in effect.

Note: If both wires are activated at the same time, the Launch limit (Dark Blue) will override the Burnout value.

RPM ACTIVATED WINDOW SWITCH

This feature can be programmed to activate and deactivate a circuit at desired rpm points. This RPM Switch will supply a ground path to a circuit through the Purple/Blue wire and then remove it at the selected rpm. It is capable of handling 3 amps continuous.

SEQUENCED SHIFT LIGHT/GEAR SELECTOR

MSD offers a Shift Light/Gear Selector, PN 4360, that easily connects to the 2-Pin connector of the MC-4 Ignition Control (Figure 3). Five different gear selected rpm points can be programmed to turn the shift light On from 2,000 – 15,000 rpm in 100 rpm increments. This feature can also be attached to an air shifter to automatically shift the bike. The Red/Green +12V output wire is fused for 3 amp maximum fuse size.

TIMING FEATURES

Note: All retards will be added together to determine the final timing setting.

START RETARD

This program will retard the timing from cranking through 800 rpm. It is automatically enabled and is adjustable from 0°-25° of retard. This eases the load on the starter and prevents backfires. The retard will deactivate if the engine rpm drops below 500 rpm.

Note: The MC-4 must be used on engines with an electric starter.

TIMING COMPENSATION

This feature allows the MC-4 to compensate for inherent retard from the trigger pickups and coils. The default is 2°. This is recommended when using a complete MSD Ignition System. Most other applications will require between 2° - 3°.

MULTI-STAGE RETARD

This Ignition offers three stages of retard that can be activated at different times via three control wires and/or an rpm programmed value. Each retard is adjustable from 0°-15° in 0.1° increments (from 800-15,000 rpm). When used together the retard stages are added together. The total maximum amount of the retards is 25°.

Each stage is activated when 12 volts are supplied to the corresponding wire and the engine speed is above the rpm value. The retard value will remain active until 12 volts are removed from the wire, or the engine speed drops below the rpm value.

Pink Wire – Stage 1 Violet – Stage 2 Tan Wire – Stage 3

Step Retard Deactivation Delay: This program allows you to select a delay time when a stage of retard is deactivated. This is useful to ensure that nitrous has stopped flowing through the engine. The delay time can be set from 0 – 2.5 seconds.

STAGE 3 RETARD RAMP

The Stage 3 retard also has a timed ramp function for progressive nitrous applications. This time is programmable from .1 to 9.9 seconds (Note: If this is set to zero the third stage functions exactly like stages 1 and 2). If a value above zero time is entered then the third retard stage will progressively retard the timing over this time frame. The start point for the progressive retard can be activated by the release of the launch rev limiter, by rpm or by a separate external activation wire that can be connected to a timer or other devices.

LAUNCH RETARD TIMING CURVE

This program can be set from 800 – 15,000 rpm (Every 100 rpm) in steps as small as 0.1° up to 25°. It is rpm dependent. When 12 volts are applied to the Dark Blue wire this program is activated. It will override the Run Timing Program until the bike is shifted to second gear where the Run Timing Curve is activated and in for the duration of the run.

Note: All retards are added together when activated. If a stage of retard is activated at the same time as the Launch Retard or Launch Timing Curve, the programmed retards are added together. It is recommended to view the Retard Sum using the Hand Held Programmer or the MSD Pro-Data+ Graph View.

LAUNCH RETARD RAMP

This feature allows the ignition timing to ramp back to the Launch Timing Curve over a programmable amount of time from 0 – 2.5 seconds in 0.010 second increments. The retard is programmable from 0° - 15° degrees in .5° increments. This Ramp time is activated when the 12 volts are removed from the Dark Blue (Launch Retard/Launch RPM) wire.

GEAR RETARDS

This feature allows you to program a different retard for each gear without any extra wiring. Once the shift sequence is reset with the Launch Control Wire (Dark Blue), the MC-4 will retard the timing automatically following each shift. Zero to 5° can be removed in each gear and the retards are cumulative (example: 3° in 3rd, 3° in 4th and 4° in 5th, total 10°). The Launch Control Retard Curve allows 1st gear timing and 2nd gear uses the Run Retard Curve. Each additional shift can be programmed to have additional retards without the use of external switches.

RUN TIMING CURVE

This is the program for the full ignition timing curve from 800 – 15,000 rpm. The curve is adjustable in 0.1° increments every 100 rpm with 25° maximum. The Run Timing Curve is the default program and remains active at all times unless the Launch Timing Curve is activated at which point it is overridden until the first shift when the Launch Timing Curve is deactivated.

Note: The Run Timing Curve will be added to any Stage Retards and Gear Retards that are activated throughout the run. Maximum retard using the Run Curve is 25°.

INDIVIDUAL CYLINDER MANAGEMENT (ICM)

This program allows you to select a retard for each cylinder. Each cylinder can be programmed to have up to 5° of timing removed and is adjustable in 0.1° increments. This amount is added to any retard amount being used with the Run Curve or Step Retards.

To take advantage of the ICM, a Cam Sync Sensor must be incorporated. MSD offers a Universal Cam Sync Pickup, PN 2346. A Sync Sensor is necessary to alert the Ignition Control when the number one cylinder is being triggered. When the Ignition knows that the number one cylinder is firing, it starts the triggering sequence and uses the retard set for each cylinder at the correct time.

The Cam Sync pickup must be phased correctly with the crank trigger. It should be adjusted initially to lead the #1 cylinder by 5° - 10°. This will get it close enough to run the engine. You then need to center the sensor signal around the trigger pickup signal for correct operation over the entire rpm range of the engine. This is set by using the Pro - Data+ or monitor mode on the Programming Unit. You can then move the Sync pickup until the monitor reads CamSync SYNC.

The Ignition monitors both ignition trigger and cam sync inputs for every revolution of the engine. Also, the LED will flash a code 2 (blink-pause-blink) and the Hand Held Programmer will read CamSync None or No CamSync if there is an error with the Cam Sync Pickup. For complete setup instructions see the Programming Instructions located on page 12 of these instructions.

Note: On one cylinder applications a Cam Sync is not required. On two cylinder, no waste spark applications, a CamSync is not required.

Note: The MSD PN 8916 Universal Cam Sync can be used with 2 or 4 cylinder waste spark engines for ICM.

SHIFT KILL

There are two input options for the shift kill feature.

Note: The supplied Diode may need to be used, if you are using the Yellow Kill Wire connected to the shift solenoid (Figure 9).

- If you are using a push button air shifter, then the Yellow wire will be used and the three time - delayed kill modes will be available.
- If you are using the Shift Light output to automatically activate your air shifter, then you can select "ShiftLight" under the kill source feature. This will provide a kill as soon as the shift light outputs to the Airshifter. All the Shift Kill time delay modes are still available.

  Note: The Yellow wire can still be used in this configuration for a manual kill.
- Shift Kill Delay - Programmable from 20 to 99 milliseconds in 1 millisecond intervals. This allows a delay from the time the shift kill is activated until the engine kill function turns off. This delay is essential to allow the transmission to make a complete shift.
- Shift Kill Modes - Three modes are available:
  1. Manual - This will provide a kill everytime the kill is activated.
  2. Auto 1, 2 - This will ignore the first shift but provide a kill for every sequential shift thereafter.
  3. Auto 1, 2, 3 - This will ignore the first two shifts but provide a kill for every sequential shift thereafter.

OPTIONAL BOOST RETARD CURVE

The MC-4 has an external 3 - pin connector (Figure 4) that will attach to one of two optional Map Sensors PN 23121 (2 Bar) 2-29 psi or PN 23131 (3 Bar) 2-44 psi. When this sensor is used, a timing curve can be programmed into the MC-4 based on the pressure within the intake manifold. This is especially useful for turbo applications. This feature is programmable from 2 to 45 psi in 0.25 psi increments, from 0-25° retard in .1° increments.

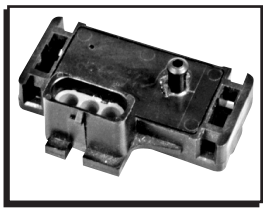


Figure 4

WIRING FUNCTIONS

	Power Leads	These are the two heavy 12 gauge wires and are responsible for getting direct battery voltage to the ignition. The Ignition is load protected from reverse battery connections and will automatically shut down if there is over 27 volts input.
	Heavy Red	This wire connects directly to the battery positive (+) terminal or a positive battery junction such as the starter solenoid. **Note:** Do not connect to the alternator.
	Heavy Black	This wire connects to a good ground, either at the battery negative (-) terminal or to the engine. **Note:** Engine must be grounded to battery negative.
	Ignition Switch	
	Red	This wire is responsible for turning the MC-4 On and Off as well as supplying power to the triggers. Connect to a switched 12 volt source such as the ignition key or switch. Also recommended for lanyards.
	Coils	
Coil 1	**Brown/Orange**	This wire connects to the coil 1 positive (+) terminal. This is the **ONLY** wire that makes electrical contact with the positive coil terminal.
Coil 1	**Brown/White**	This wire connects to the coil 1 negative (-) terminal. This is the **ONLY** wire that makes electrical contact with the negative coil terminal.
Coil 2	**Brown/Orange**	This wire connects to the coil 2 positive (+) terminal. This is the **ONLY** wire that makes electrical contact with the positive coil terminal.
Coil 2	**Brown/Green**	This wire connects to the coil 2 negative (-) terminal. This is the **ONLY** wire that makes electrical contact with the negative coil terminal.
	Trigger Pickups	
4 - Pin Connector	**White/Blue**	+12V to Trigger Pickups.
4 - Pin Connector	**Black**	Ground to Trigger Pickups.
4 - Pin Connector	**White (Coil 1)**	This wire is used to connect to breaker points or trigger pickups (Dyna* or MSD), electronic ignition amplifier output or to the trigger output of the ECU for coil 1. (*Single Magnet Rotor Only.)
4 - Pin Connector	**Green (Coil 2)**	This wire is used to connect to breaker points or trigger pickups (Dyna* or MSD), electronic ignition amplifier output or to the trigger output of the ECU for coil 2. (*Single Magnet Rotor Only.)
	2 - Pin Connector Cam Sync	
	Light Blue Light Green	This 2-pin connector plugs into a Cam Sync Sensor to indicate when the number one cylinder is triggered.
		Accessories
	3-Step Rev	
	Light Blue	This wire activates the Burnout rev limit when 12 volts are applied.
	Dark Blue	When 12 volts are applied, this wire activates several features including; Launch rev limit, Launch Retard value, Launch Timing Curve and will reset the Shift Light sequence to 1st gear & Step 3 slope.

WIRING FUNCTIONS CONTINUED

Tach Output	
Gray	Used to provide a tach signal to rpm sensing devices. 12 volt square wave with 30° duty cycle.
3-Step Retard	
Pink	This wire activates the first retard stage when it is applied to 12 volts. When 12 volts are removed the retard is deactivated.
Violet	This wire activates the second retard stage when it is applied to 12 volts. When 12 volts are removed the retard is deactivated.
Tan	This wire activates the third retard stage when it is applied to 12 volts. When 12 volts are removed the retard is deactivated if ramp value = 0. Step 3 retard ramp can be activated by this wire providing a progressive retard ramp that is programmable from .1 to 9.9 seconds.
Shift Light/Shifter 2 Pin Connector	
Red/Green Yellow/Orange	Shift Light activation wire. Connects to the Shift Light PN 4360 or to any air shifter with a 3 Amp or less current draw. A 3 Amp fuse is in line on the Red/Green wire.
RPM Switch	
Purple/Blue	RPM Activation Switch. This wire will supply a ground to complete a circuit at a desired rpm. It will handle up to 3 Amps continuous.
Map Sensor 3 Pin Connector	
Brown/Violet Brown/Yellow Dark Brown	Three Pin Connector - Used for an optional external pressure sensor for turbo applications (2 - Bar/2-29 psi - PN 23121) (3 - Bar/2-44 psi - PN 23131).
Shift Kill	
Yellow	Used to activate the Shift Kill feature. **Note:** Do Not use for kill lanyard.

GENERAL INFORMATION

BATTERY

The MC-4 Ignition Control will operate on any negative ground, 12 volt electrical system. The MC-4 can be used with 16 volt batteries and can withstand a momentary 24 volts in case of jump starts. The MC-4 Ignition will deliver full voltage with a supply of 11- 18 volts and will operate momentarily with a supply voltage as low as seven volts.

If your application does not use an alternator, allow at least 15 amp/hour for every half hour of operation. The MC-4 uses about .7 Amps for every 1,000 rpm. If the engine is cranked with the same battery or other accessories such as an electric fuel or water pump are used, the Amp/hour rating should be higher.

COILS

MSD Motorcycle Blaster Coils, PN 8204 or PN 4573, are recommended with this ignition. For single or twin cylinder, single plug applications, the PN 42921 Pro CD Coil is recommended. For more information on recommended coils, contact our Customer Support Department at (915) 858-3365.

TACHOMETERS

The MC-4 Ignition features a Tach Output Wire (Gray). This wire provides a trigger signal for tachometers, a shift light or other add-on rpm activated devices. The Tach Output Terminal produces a 12 volt square wave signal with a 30° duty cycle. Some vehicles with **factory tachometers/fuel pumps may require a Tach Adapter** to operate with the MC-4. For more information on Tachometers and Tach Adapters, see the Tachometer Section on page 8.

SPARK PLUGS AND WIRES

Spark plug wires are very important to the operation of your ignition system. A good quality, helically wound wire and proper routing are required to get the best performance from your ignition, such as the MSD 8.5mm Super Conductor Wire. Helically wound wires provide a good path for the spark to follow while keeping Electro Magnetic Interference (EMI) to a minimum. Excessive EMI, such as the amount that solid core wires produce, will interfere with the operation of the MC-4. **Solid Core spark plug wires cannot be used.** The PN 31449 is a 4 - Cyl. 8.5mm Wire Set.

Routing: Correct routing of the plug wires is also important to performance. Wires should be routed away from sharp edges and engine heat sources. If there are two wires that are next to each other in the engine's firing order, the wires should be routed away from each other to avoid inducing a spark into the other wire.

Spark Plugs: Choosing the correct spark plug design and heat range is important when trying to get the best performance possible. Since there are so many engine combinations and manufacturers, MSD cannot recommend which plug or gap is exactly right for your application.

It is recommended to follow the engine builder or manufacturer's specification for spark plugs. With that, you can then experiment with the plug gap to obtain the best performance. The gap of the plugs can be opened in 0.005" increments, then tested until the best performance is obtained.

Sealing: The MC-4 is potted completely with a polyurethane compound for vibration and water resistance.

Welding: If you are welding on your motorcycle, to avoid the chance of damage always disconnect all power and ground cables of the MC-4 (You should disconnect the tach ground wire too).

MOUNTING

The MC-4 can be mounted in any location as long as it is away from direct engine heat sources. It is not recommended to mount the unit in an enclosed area.

GENERAL WIRING INFORMATION

Wire Length: All of the wires of the MC-4 Ignition may be shortened as long as quality connectors are used or soldered in place. To lengthen the wires, use one size bigger gauge wire (10 gauge for the power leads and 16 gauge for the other wires) with the proper connections. All connections must be sealed.

Grounds: A poor ground connection can cause many frustrating problems. When a wire is specified to go to ground, it should be connected to the battery negative terminal, engine block or chassis. There should always be a ground strap between the engine and the chassis. Always securely connect the ground wire to a clean, paint free metal surface.

Routing Wires: The MC-4 wires should be routed away from direct heat sources such as exhaust manifolds and headers and any sharp edges. The trigger wires should be routed separate from the other wires and spark plug wires. It is best if they are routed along a ground plane such as the block or frame.

PRESTART CHECK LIST

- The only wires connected to the coil terminals are the MC-4 wires to coil positive and coil negative.
- The small Red wire of the MC-4 is connected to a switched 12 volt source and, if used, the lanyard is installed.
- Confirm the cylinder select is in the proper position for your application.
- The power leads are connected directly to the battery positive and negative terminals.
- The battery is fully charged.
- The engine is equipped with at least one ground strap to the chassis.

TROUBLESHOOTING

Every MSD Ignition undergoes numerous quality control checks including a four hour burn-in test. If you experience a problem with your MC-4, our research has shown that the majority of problems are due to improper installation or poor connections. The Troubleshooting section has several checks and tests you can perform to ensure proper installation and operation of the MC-4. If you have any questions concerning your MC-4, call our Customer Support Department at (915) 858-3365, 8 - 5 Mountain Time, or e-mail at: tech@msdpowersports.com.

LED

The LED on the side of the MC-4 monitors several operating conditions of the MC-4. If the LED indicates that there is a problem with the ignition system, follow the steps through the Troubleshooting section. The LED will appear to be on steady at above idle speeds when everything is functioning properly.

- A Code 2 (flash flash) will flash if there is a problem with the Cam Sync Signal.
- A Code 3 (flash flash flash) will flash if the supply voltage drops below 12 volts, when operating below 3300 rpm.
- The LED will flash for every trigger signal from the crank trigger. You can take advantage of this when statically setting the timing of the engine.

TACH/FUEL ADAPTERS

If your tachometer does not operate correctly you probably need a Tach Adapter. The chart in Figure 5 lists common tachometers and if an Adapter is necessary.

Tachometer Compatibility List

AFTERMARKET TACHOMETER	WHITE WIRE TRIGGER
AUTOGAGE	REQUIRED
AUTOMETER	NO TACH ADAPT REQUIRED
MALLORY	NO TACH ADAPT REQUIRED
MOROSO	NO TACH ADAPT REQUIRED
STEWART	REQUIRED
S.W. & BI TORX	REQUIRED
SUN	REQUIRED
VDO	REQUIRED

Figure 5 Common Tachometers and Adapters.

MISSES AND INTERMITTENT PROBLEMS

Experience at the races has shown that if your engine is experiencing a miss or hesitation at higher rpm, it is usually not directly ignition. Most probable causes include faulty wiring, a coil or plug wire failure, arcing from the boot plug to ground. Several items to inspect are:

WARNING: Do not touch the coil terminals during cranking or while the engine is running.

- Always inspect the plug wires at the plug for a tight connection and visually inspect for cuts, abrasions or burns. Dielectric grease such as Spark Guard, PN 8804, is also recommended.
- Inspect the Primary Coil Wire connections. **Caution:** There may be high voltage at the Coil Positive (+) terminal even with the key turned On. During cranking or while the engine is running, very high voltage will be present and no test equipment should be connected.
- Make sure that the battery is fully charged and the connections are clean and tight. If you are not running an alternator this is an imperative check. If the battery voltage falls below 11 volts during a race, the MC-4 current draw will increase.
- Is the engine running lean? Inspect the spark plugs and complete fuel system.
- Inspect all wiring connections for corrosion or damage. Remember to always use proper connections followed by soldering and seal the connections completely.
- If you are using the Yellow Shift Kill Wire with a Shift Solenoid, you may be getting a double kill when shifting. Attach the supplied Diode to the solenoid as shown in Figure 9.

If everything checks positive, use the following procedure to test the ignition for spark.

MSD also offers an Ignition Tester (Figure 6), PN 43751. This tool allows you to check your complete ignition system while it is on the bike as well as the operation of rpm limits, activated switches and shift lights and the Cam Sync Signal.

Figure 6 PN 43751 Tester.

CHECKING FOR SPARK

Note: All ignition operations can be tested with the MSD 43751 MC Tester.

1. Remove the coil wires from the spark plug and set them approximately 1/2" from ground.
2. Disconnect the MC-4 wire from the points or trigger.
3. Connect the Green wire to ground.
4. Turn the ignition to the On position. Do not crank the engine.
5. Tap the white wire to ground quickly several times (Figure 7). Each time you pull the wires from ground, a spark should jump from the coil wires to ground. If spark is present, the ignition is working properly. Do the same test using the Green Trigger wire. If there is no spark skip to step 7 below:
6. If there is no spark:
   A. Inspect all of the wiring.
   B. Substitute another coil and repeat the test. If there is now spark, the coil is at fault.
   C. If there is still no spark, check to make sure there are 12 volts on the small Red wire from the MC-4 when the key is in the On position. If 12 volts are not present, find another switched 12 volt source and repeat the test.
   D. If, after following the test procedures and inspecting all of the wiring, there is still no spark, the MC-4 Ignition is in need of repair. See the Warranty and Service section for information.

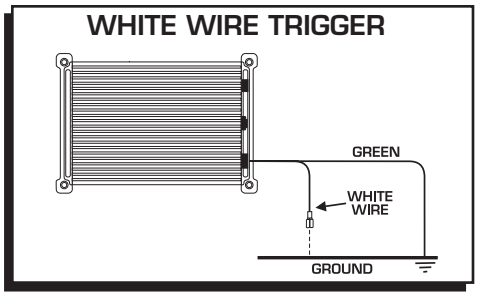


Figure 7 Checking for Spark.

The following wiring diagrams illustrate numerous installations on different vehicles and applications. If you experience difficulties when installing your MSD, contact our Customer Support Department at (915) 858-3365 (8 - 5 Mountain time) or e-mail us at: tech@msdpowersports.com.

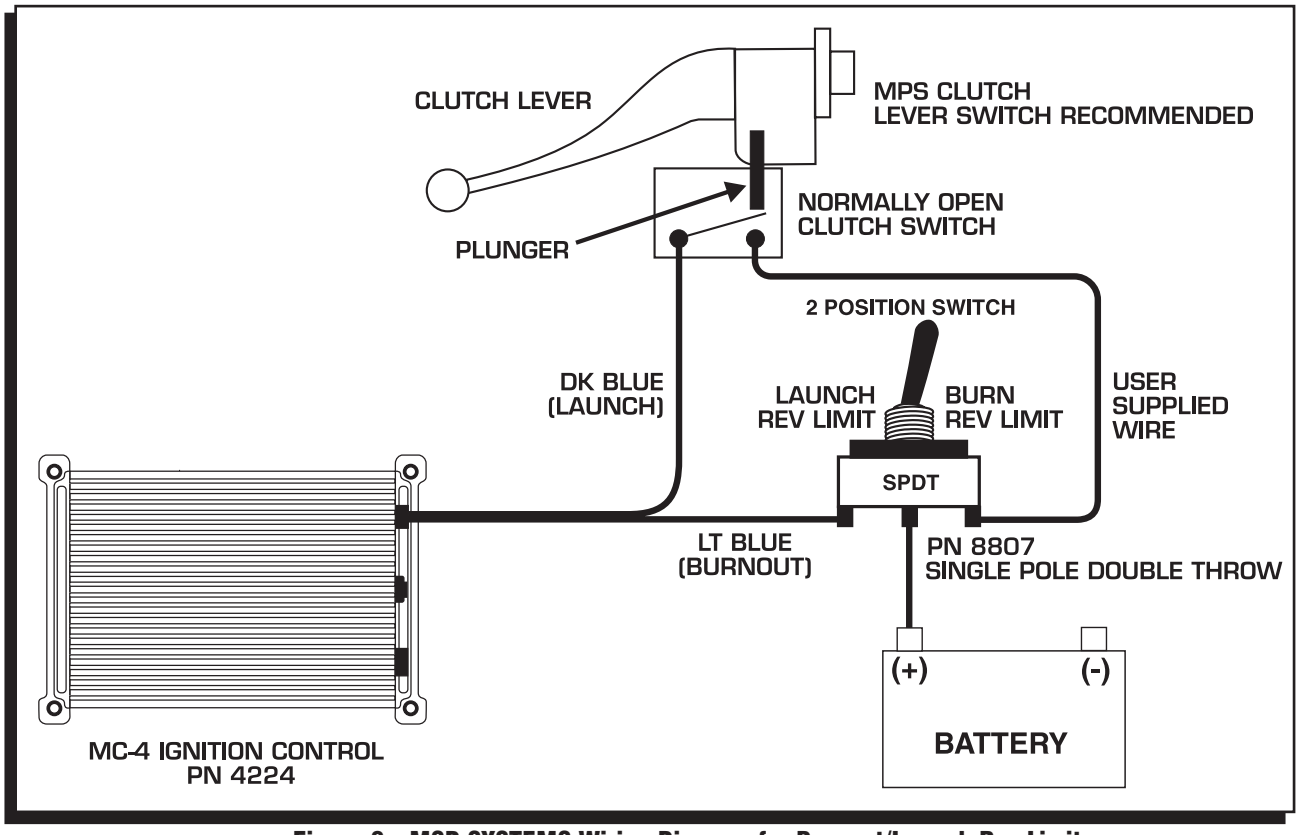


Figure 8 - MSD SYSTEMS Wiring Diagram for Burnout/Launch Rev Limits.

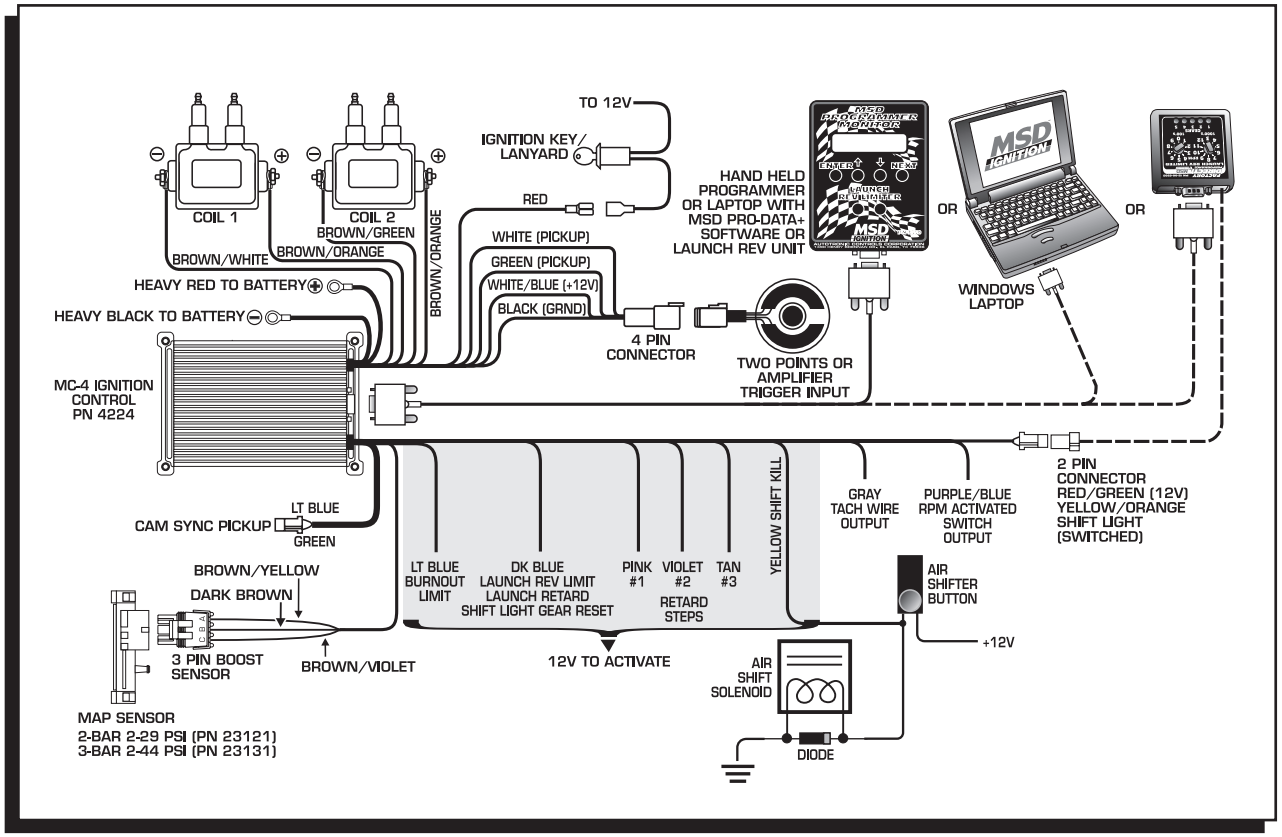


Figure 9 4 - Cylinder Single Plug WSON (Waste Spark ON - Crankshaft Triggered).
2 - Cylinder Dual Plug WSOFF (Waste Spark OFF - Camshaft Triggered).

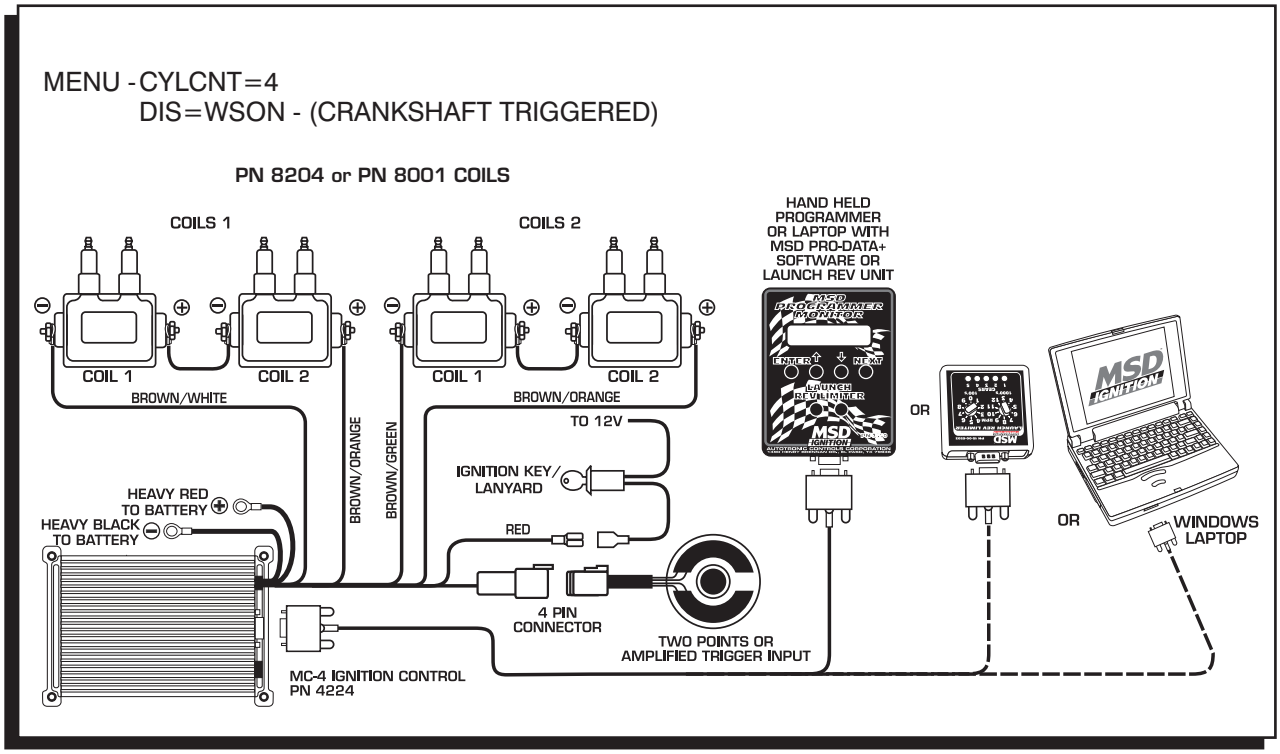


Figure 10 4-Cylinder Dual Spark Plug System Wiring WSON (Waste Spark).

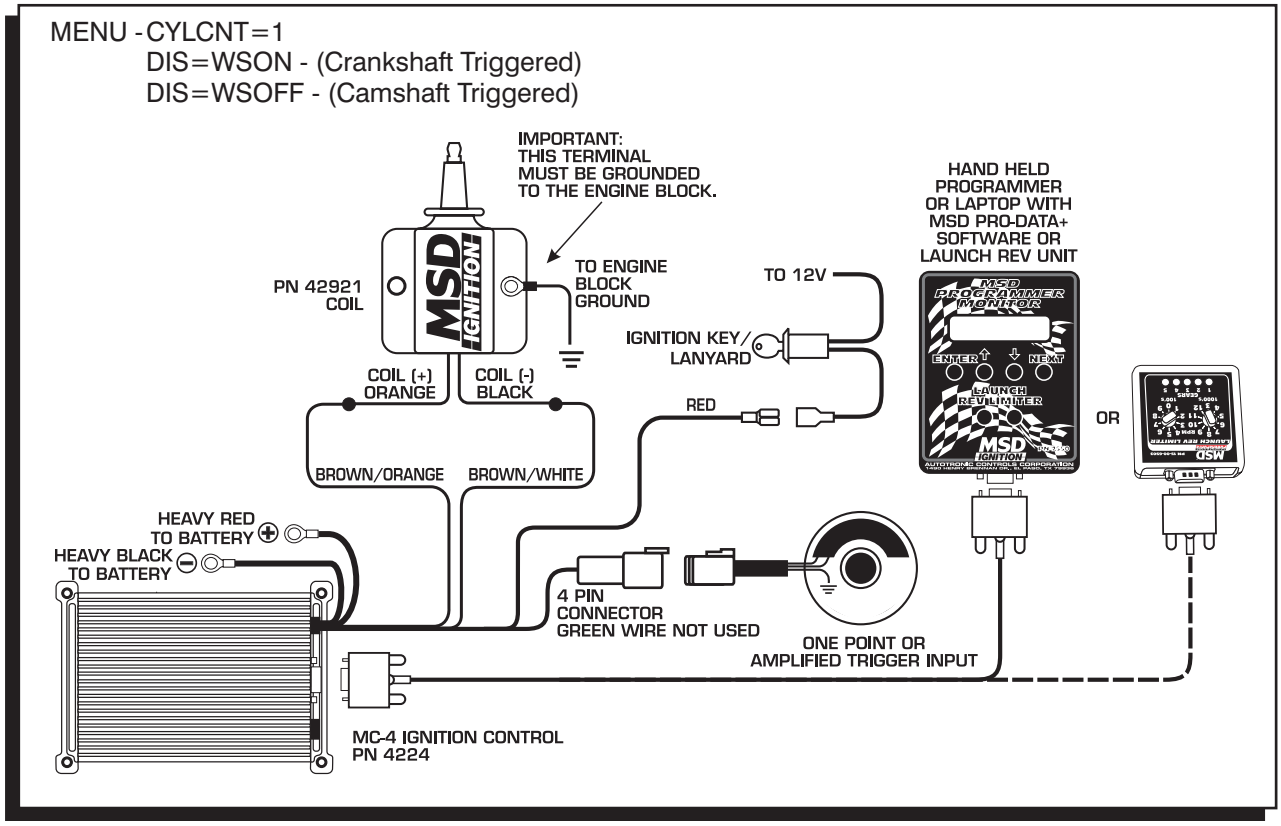


Figure 11 Single Cylinder Wiring.

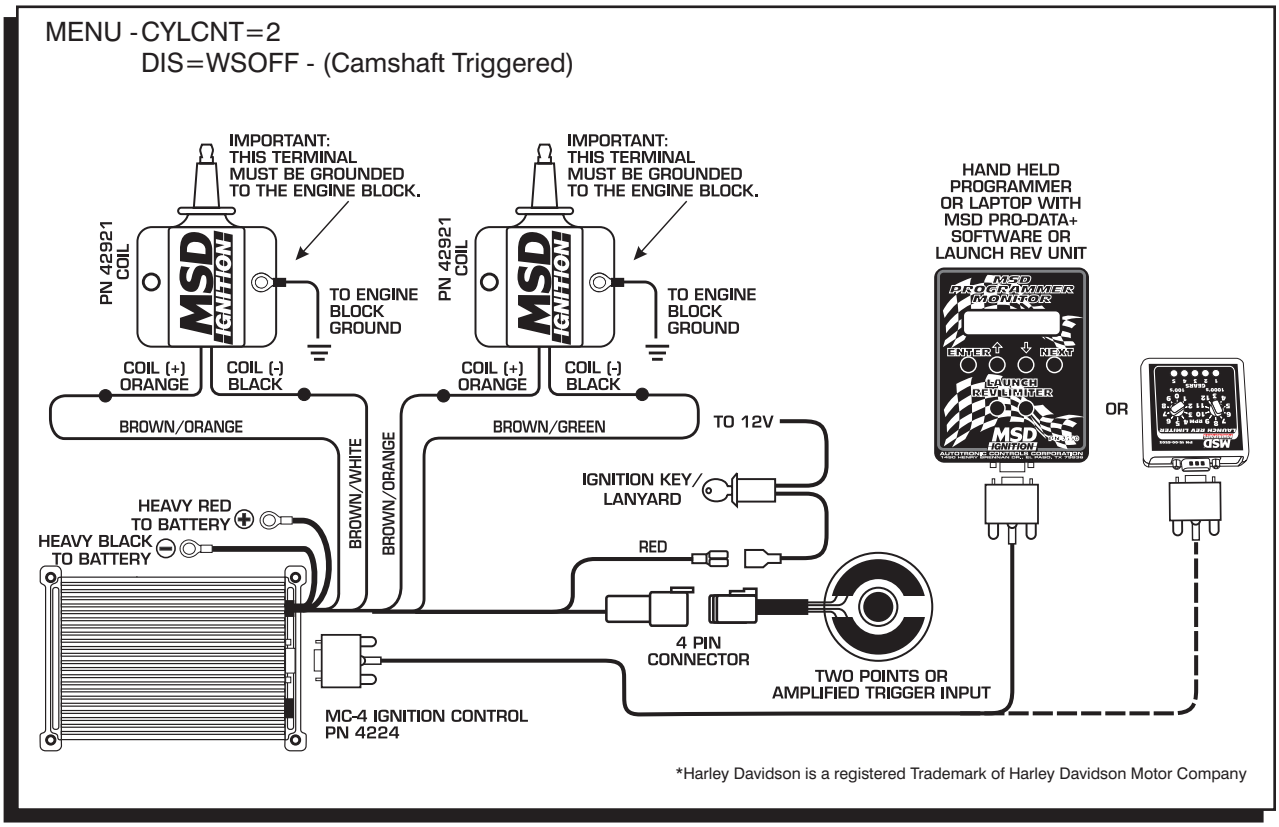


Figure 12 2 - Cylinder - Single Fire - WSOFF (No Waste Spark - Harley Davidson®).

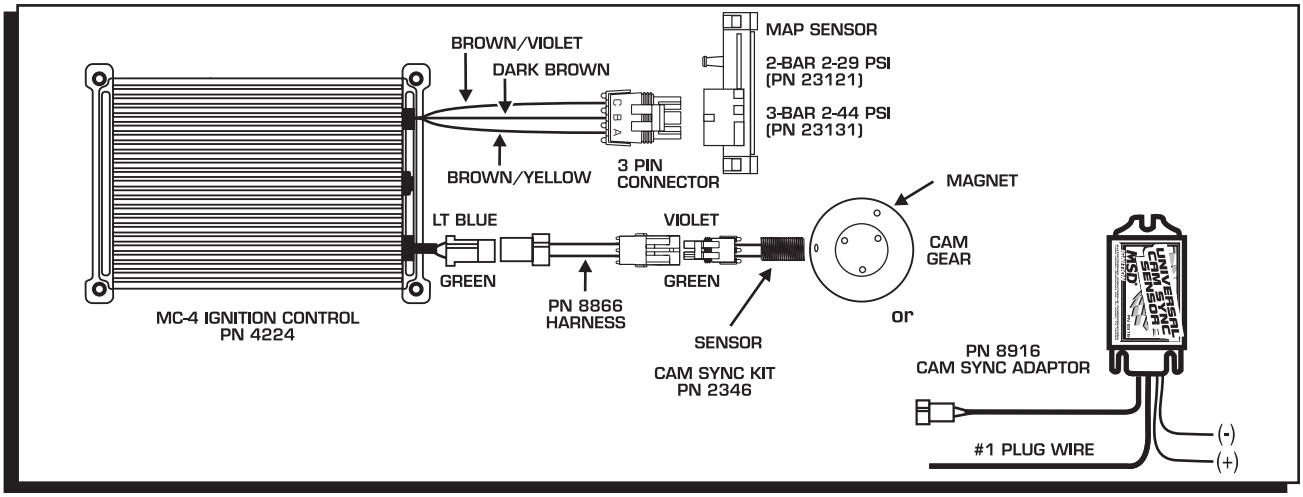


Figure 13 Using a Sync Signal or Map Sensor.

PROGRAMMING THE MC-4

These instructions will walk you through the different programming features of the MC-4 Ignition using the Pro-Data+ Software.

INSTALLATION

1. Insert the installation CD into your CD drive.
2. In Windows click “Start” then Select “Run”.
3. In the box type “D:\Setup” (or corresponding drive) Press Enter.
4. The screen will walk you through several steps.
5. Once loaded, your monitor will have an MSD Graph View logo. Click on it to open the software.
6. A program will open. Go to the upper left corner of the screen and click on File, then Open.
7. This will open a menu of part numbers. Select "4224".
8. This will open another menu of versions. Highlight and open the "MC4vxx.IGN" (xx = The latest version #; Example "03". This will open the Pro-Data+ software for the Ignition Controller.

At this point you are in the default setting for the MC-4 Ignition. When you make a change to this file always select the “Save As” option and rename the new file.

MONITOR

The rpm meter is a graphical interface that allows you to monitor the rpm, boost pressure and retard functions of the MC-4 while the engine is running. The dial on the left side will indicate the total rpm and boost pressure of the engine in real time. The dial on the right side will show the total degrees retard sum while the bar graph in the lower right corner will show you the total degrees for each cylinder.

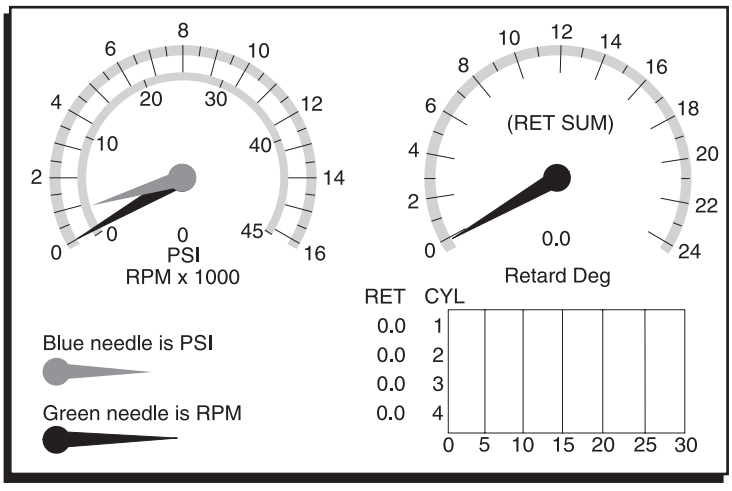


Figure 14 RPM and Retard Monitor.

INITIAL SETUP INFORMATION (SECTIONS 1 THRU 3)

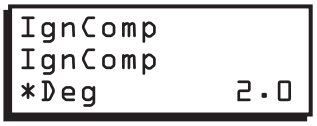
The first step is going to tell the MC-4 what application you are using it on and what optional features you are using, if any. The default settings are for a four cylinder engine with a Waste Spark (Two spark plugs fire at the same time). This is the most common configuration. The default transmission is five gears.

INITIAL TIMING

Because of the advanced circuitry of the MC-4 Ignition, it is necessary to set the initial timing with the LED 4° more advanced than what you want your actual timing to be. For Example: If you want 32° of initial timing, then you will need to statically time your engine for 36° **using the LED light** on the MC-4.

Note: In order to use the LED on the MC-4 to static time your engine you should turn all alerts to Skip.

TIMING COMPENSATION FEATURE - (DEFAULT 2°)



All ignition systems have an inherent amount of retard that occurs from the trigger pickups, coils and in some cases the Ignition itself. The timing compensation feature of the MC-4 will make an adjustment automatically to compensate for this retard. In order for this feature to work properly the initial timing must be increased by 4° (See Initial Timing above). The default IgnComp setting is 2°. This is the recommended setting if you are using the MSD trigger pickups and coils. Most other applications will use between 2°-3° of compensation. The options are: 0°-3° in .5° increments.

ENGINE CONFIGURATION

CylCnt – (Default 4-Cyl.)

This tells the MC-4 how many cylinders your engine has. The options are:

Use the chart on the next page to help you figure out your settings.

1– **One Cylinder Applications –** This is if you are using only the white trigger wire.

2– **Two Cylinder Applications –** You will have the option of selecting either the White trigger wire (if you have a waste spark or distributor) or both the White and Green trigger wires (if you are firing each cylinder independently).

4– **Four Cylinder Applications –** You will have the option of selecting either the White trigger wire (if you have a distributor) or both the White and Green trigger wires (if you are firing a waste spark).

Ws– **(Default WSON – Waste spark On)**
This tells the Ignition if you are using a distributor or if you are firing a wasted spark application or not. The options are:

Ws None– This means you are using only the White trigger wire and you are using a distributor. **Note:** This would only be used for two or four cylinder applications using a distributor and only the White trigger wire.

WsON– **This means "Waste Spark On" –** This means you are firing a wasted spark system. **Note:** This would be used for Single Cylinder engines with the trigger pickup off the crankshaft or Two Cylinder applications using one trigger pickup or Four Cylinder applications using two trigger pickups (Both the White and Green trigger wires).

WsOF – This means "Waste Spark Off" – This means you are firing each cylinder independently. **Note:** This would only be used for single cylinder applications or two cylinder applications using two trigger pickups triggering off the camshaft (Both the White and Green trigger wires).

ENGINE CONFIGURATION CHART

The MC-4 is primarily used with the four stroke engine in mind so the default is configured for these engines. If you plan to use the MC-4 on a two stroke application then you must understand that the firing duration sequence is different between a four stroke and two stroke. For example a four cylinder four stroke engine has the same firing duration sequence as a two cylinder two stroke. For this reason you must select the corresponding cylinder count for a two stroke. See below.

FOURSTROKE Engine Configuration Chart

Single Cylinder - Note: A cam sync will not be used.
Waste Spark None (WsNONE) - Use with single cam triggered pickup.
Waste Spark On (WsON) - Use with Crank Trigger pickup.
• Briggs & Stratton

Twin Cylinder -
Waste Spark None (WsNONE) - Use on engines with distributors.
Note: An external Cam Sync must be used to identify cylinder one.
Waste Spark On (WsON) - Use with single pickup triggered from the crankshaft. This would use one double ended coil which fires both cylinders at the same time (Waste Spark) at TDC of each stroke.
Note: This must be an even fire engine. Harley odd fire engines will not work in this mode.
Note: An external cam sync must be used to identify cylinder one.
Waste Spark Off (WsOFF) - Use with engines with two trigger pickups that are triggered from the camshaft. This also applies to distributor applications that have two trigger pickups and two coils.
Note: The Cam Sync input can be set to Channel 1.
• All Harley applications using two triggers and two coils.

Four Cylinder -
Waste Spark None (WsNONE) - Use on engines with distributors. **Note:** An external Cam Sync must be used.
• All automotive and motorcycle applications that have a distributor rotated by the camshaft.
Waste Spark On (WsON) - This is the most common four stroke application. This means you have two trigger pickups triggered from the crankshaft and two dual output coils.
Note: An external Cam Sync must be used to identify cylinder one.
• Kawasaki KZ • Suzuki GS • Suzuki GSXR
Waste Spark Off (WsOFF) - This is not a valid option with the MC-4.

TWO STROKE Engine Configuration Chart

Note: The cylinder selection you will use for a two stroke application will be different than the actual cylinder count.

Single Cylinder - Your selection on the Pro Data+ will be 2 Cylinders.
Waste Spark None (WsNONE) - This is the only option for a single cylinder two stroke engine. **Note:** Cam Sync Input will not be used.

Twin Cylinder - Your selection on the Pro Data+ will be 4 Cylinder.
Waste Spark None (WsNONE) - This option will be used with one trigger pickup firing twice per revolution with a double ended coil. You would be firing both at TDC and at BDC.

TRANSMISSION CONFIGURATION

The next step will tell the MC-4 how your transmission is setup to determine the correct shift kill procedure as well as shift light points.

Last Gear – (Default 5 - 5 Gears)

This tells the MC-4 how many gears your transmission has. The options are: 2-3-4-5-or 6. Select the appropriate number of gears for your transmission.

Drop RPM – (Default 600 RPM)

This will tell the MC-4 how far the engine rpm will drop in order to recognize a shift. Keep in mind the engine speed has to increase by at least 200 rpm before the next gear change can be made to prevent double shifting. The options Are: 500 – 1,500 rpm in 100 rpm increments.

Kill Mode – (Default Auto 12)

This tells the MC-4 how you would like the kill feature to operate. The options are:

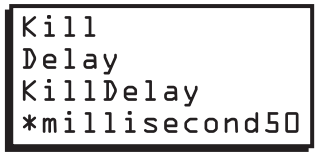
Manual – This provides a kill every time a shift is made.

Auto12 – This prevents a kill from occurring on the first shift but then provides a kill for each additional shift thereafter.

Auto123 – This prevents a kill from occurring on the first two shifts but then provides a kill for each additional shift thereafter.

Kill Delay – (Default 50 milliseconds)

This is the Kill Delay function. The Kill Delay provides a time based delay before the ignition becomes active again. This is especially important for air shifters so they have enough time to engage into the next gear. This feature will start as soon as the kill input is active.



The options are: 20– 99 milliseconds in 1 millisecond intervals.

Kill Source – (Default Kill Wire)

This allows you to select how you want the kill feature to be activated. The options are:

KillWire – This makes the external Yellow wire the shift kill activation wire. This is for standard rider actuated air shifting. The kill delay time will start as soon as the kill wire is activated.

Shiftlight – This option will activate the kill feature and delay as soon as the shiftlight turns on. This is for applications where the shiftlight output is used to control the actuation of the airshifter.

INDIVIDUAL CYLINDER MANAGEMENT

If you are going to take advantage of the MC-4's Individual Cylinder Management timing control then you will need to complete the following steps.

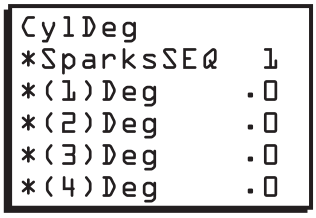
Note: If you are not using the Individual Cylinder Management then use the "Extern" option. It is also recommended you turn the alert feature OFF (Skip) for this option so you won't get the blink code.

CamSync – (Default - External)
This will tell the MC-4 what type of Cam Synchronization you will be using. The options are:

Extern – This means you are using an external source such as our Cam Sync Sensor, PN 2346. This sensor will be mounted off the camshaft and synched to the number one cylinder or the PN 8916 Universal Cam Sync can be used on 2 and 4 cylinder engines with waste spark.

Chan1 – This means you are running a single cylinder application or a two cylinder application with two trigger pickups using both the White and Green trigger wires. This will reference the White trigger pickup wire as the number one cylinder.

Note: This option cannot be used with either four cylinder engines or engines running waste spark, unless the PN 8916 is used with External - selected.



CylDeg – (Default 0°)
This is where you actually program the individual retard for each cylinder. These are labeled by spark sequence since the firing order may vary between engines. There are four adjustments sequences. These are labeled SparkSEQ1 thru 4.

SparkSEQ1 is going to refer to the cylinder that has the Cam Sensor on it or the cylinder attached to the White wire in non-waste spark engines.

SparkSEQ2 is going to be the next cylinder that is under compression and ready to fire. This may not be the #2 cylinder.

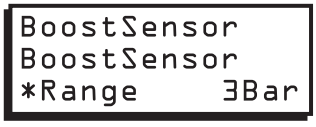
SparkSEQ3 is the Cylinder that will be under compression third in the firing order of the engine.

SparkSEQ4 is the Cylinder that will be under compression last in the firing order of the engine.

Note: This sequence number reflects the firing order of the engine not the cylinder numbers. For example if your engine has a firing order of 1, 3, 2, 4 then Cylinder 1 will be SEQ1, Cylinder 3 will be SEQ2, Cylinder 2 will be SEQ3, and Cylinder 4 will be SEQ4. The options for all four are: 0°-5° in .1° increments.

BOOST CURVE CONFIGURATION

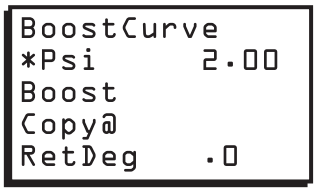
If you are using a turbo or supercharger and you would like to map out a timing curve based on the intake manifold pressure then you will need to complete the following steps.



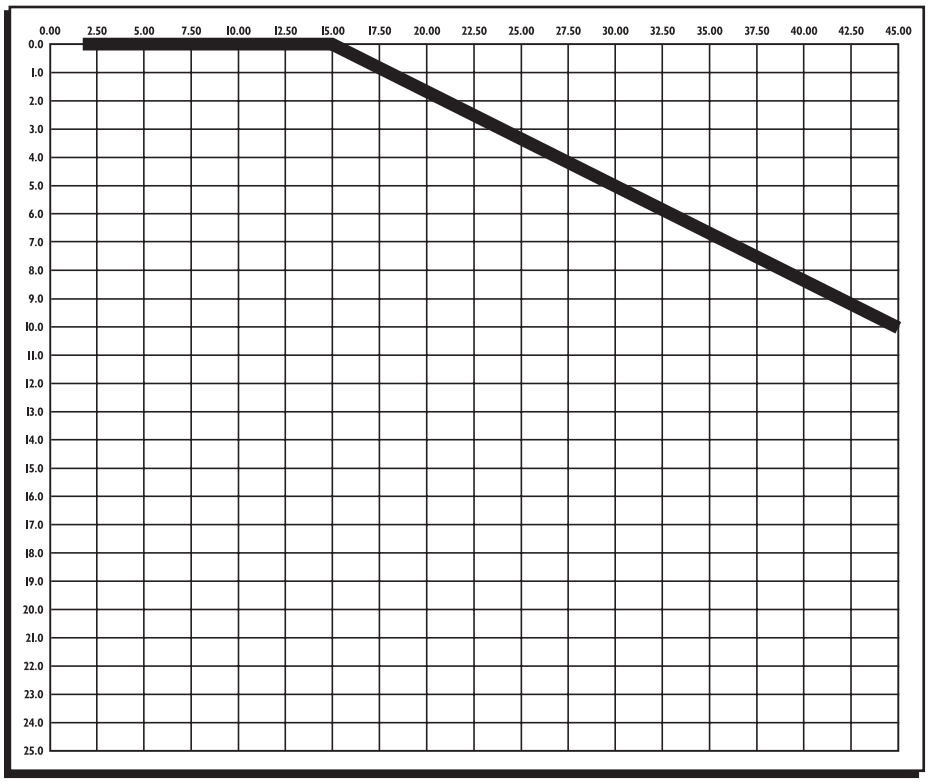
BoostSensor – (Default 3Bar)
The BoostSensor tells the MC-4 which Boost Sensor range you are using. There are two options for you to choose from.

2Bar – This is our part number PN 23121 Pressure sensor. This unit will range from 2 psi up to 29 psi. Use this sensor if you want a timing curve between these two pressure extremes.

3Bar – This is our part number PN 23131 Pressure sensor. This unit will range from 2 psi up to 44 psi. Use this sensor if you want a timing curve between these two pressure extremes.



BoostCurve – (Default - See Map)



The Boost curve is a graphical map that allows you to drag the timing curve to the different settings in order to achieve the desired curve.

The easiest way to achieve this is to maximize the box that contains the Boost Curve. In order to move the curve you will need to place your mouse pointer over the portion of the graph that you would like to move. Right click your mouse and select “Add Dot”. This will give you a red dot that you will be able to position anywhere along the curve. Continue to do this until your curve is completely mapped out. After the curve is edited, then transfer it to the MSD by selecting "Plot to MSD" to load the new curve into the MC-4 Ignition, or File-Save As to save the change in a file on the PC.

SHIFT LIGHT/SEQUENTIAL SHIFTER OPTIONS

```
ShiftLights
*ShiftLight  1
*(1)  Rpm12500
*(2)  Rpm12300
*(3)  Rpm12100
*(4)  Rpm11900
*(5)  Rpm11700
```

The shift light output wires can be used one of two ways.

- It can be attached directly to our Shift light or the PN 4306 Launch Selector/Shift light and then programmed to turn On at a different rpm for each gear.
- It can also be connected directly to an air shifter which will shift the bike automatically into each gear at different rpm if desired. **Note:** If this mode is used then you must have the Shift Kill Source set to “ShiftLight” (See page 15 “Kill Source”).

The programmable options are:
Gear1 - with an adjustable rpm value from 2,000 rpm to 15,000 rpm. (Default 12,500)
Gear2 - with an adjustable rpm value from 2,000 rpm to 15,000 rpm. (Default 12,300)
Gear3 - with an adjustable rpm value from 2,000 rpm to 15,000 rpm. (Default 12,100)
Gear4 - with an adjustable rpm value from 2,000 rpm to 15,000 rpm. (Default 11,900)
Gear5 - with an adjustable rpm value from 2,000 rpm to 15,000 rpm. (Default 11,700)

REV LIMITER OPTIONS

There are three Rev Limiter options with the MC-4. Two are activated by external wires and the third is active when the other two are not activated.

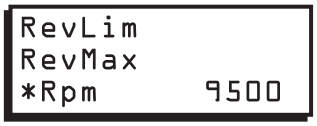
RevBurn – (Default 7,000)

```
RevLim
RevBurn
*Rpm      7000
```

This is the burnout rev limiter. If you want to do a burnout at a different rpm than your max rev limiter then you use this rev limiter. It is activated when you supply 12 volts to the Light Blue wire.
The options are: 2,000 rpm to 15,000 rpm in 100 rpm increments.

RevLaunch – (Default 6,200)
This is your Launch rev limiter. This rev limiter will be active when you supply 12 volts to the Dark Blue wire. **Note:** This rev limiter takes precedence over all other rev limiters if it is active.
This wire will also reset any counters such as gear retards, shift lights, time delays, Etc.
The options are from 2,000 rpm to 15,000 rpm in 100 rpm increments.

RevMax – (Default 9,500)
This is the Max rev limiter. This option is active when no other rev limiter is active. The options are from 2,000 rpm to 15,000 rpm in 100 rpm increments.



START RETARD OPTION

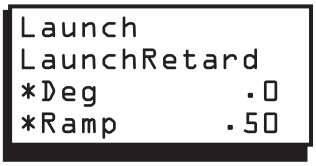
Start retard is used to ease the load on the starter and to prevent backfires. This option is in effect from 0 to 800 rpm on start up. If the engine drops below 500 rpm, it will activate again.

Start Retard (Default 10°)
The options are:
0° to 25° in 1° increments

PROGRAMMABLE LAUNCH RETARD RAMP BY TIME

This feature allows you to program from 0° - 15° of retard that will be active when the Dark Blue launch wire is active. When this Dark Blue wire is deactivated this retard will be progressively removed over the time period that is programmed into the MC-4. This is especially useful for controlling tire spin at the line. The options are:

Deg – (Default .0°)
This is the total retard that will be taken out when the Dark Blue wire is active. This is programmable from 0° - 15° in .5° increments.

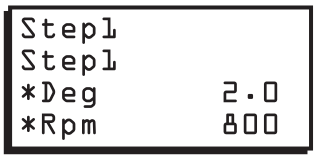


Ramp – (Default .50 seconds)
This is the total time it takes for the timing to be progressively put back in. This is programmable from 0 to 2.5 seconds in .010 second intervals.

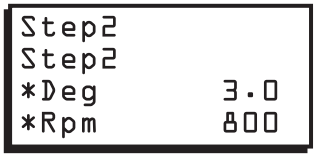
THREE STEP RETARD

There are three separate steps of retard that can be activated by rpm or an external 12 volt source. The third step can also progressively retard the timing over time by the release of the launch wire (Dark Blue), by rpm or by the external 12 volt source on the Tan wire. The options are:

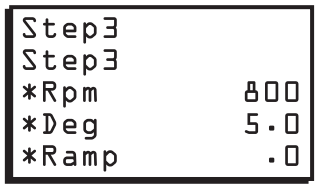
Step1 – (Default 2° - 800 RPM)
This is the first step retard. The programmable values are from 0° - 15° in .1° increments from 800 to 15,000 rpm. The external activation wire is the Pink wire.



Step2 – (Default 3° - 800 RPM)
This is the second step retard. The programmable values are from 0° - 15° in .1° increments from 800 to 15,000 rpm. The external activation wire is the Violet wire.



Step3 – (Default 5° - 800 RPM)
This is the Third step retard. The programmable values are from 0° - 15° in .1° increments from 800 to 15,000 rpm in 100 rpm. The external activation wire is the Tan wire.



Ramp – (Default .0 seconds)
This is only for the Step 3 retard. By putting a value from .1 to 9.9 seconds this option will progressively increase the timing retard set in Step 3 over the course of the time value programmed. This is especially important for progressive nitrous applications. This feature is reset when the Launch wire (Dark Blue) is activated. This feature will also pause the timing if the power is interrupted from the Tan wire or the rpm drops below the Step 3 rpm value, and will pick up where it left off when power is reapplied to the Tan wire, or if the rpm climbs above the Step 3 value.
Note: Each step is independent and can be activated in any order.
Note: All step retards are added together for the total timing retard.

GEAR SELECTABLE RETARD

This option will retard the timing a different value in gears 3 through 6. The options are:

Gear3 – (Default 0 Degrees)
When a retard value between 0° and 5° in .1° increments is programmed the timing will retard by that setting in this gear.

Gear4 - (Default 0 Degrees)
When a retard value between 0° and 5° in .1° increments is programmed the timing will retard by that setting in this gear, in addition to the Gear3 value.

Gear5 - (Default 0 Degrees)
When a retard value between 0° and 5° in .1° increments is programmed the timing will retard by that setting in this gear, in addition to the Gear3 and Gear4 value.

Gear6 - (Default 0 Degrees)
When a retard value between 0° and 5° in .1° increments is programmed the timing will retard by that setting in this gear, in addition to the Gear3, Gear4 and Gear5 value.

Note: Gear retards are added together with any other retard values.

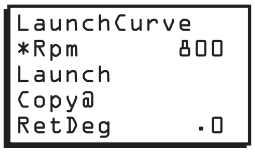
STEP OFF DELAY BY TIME

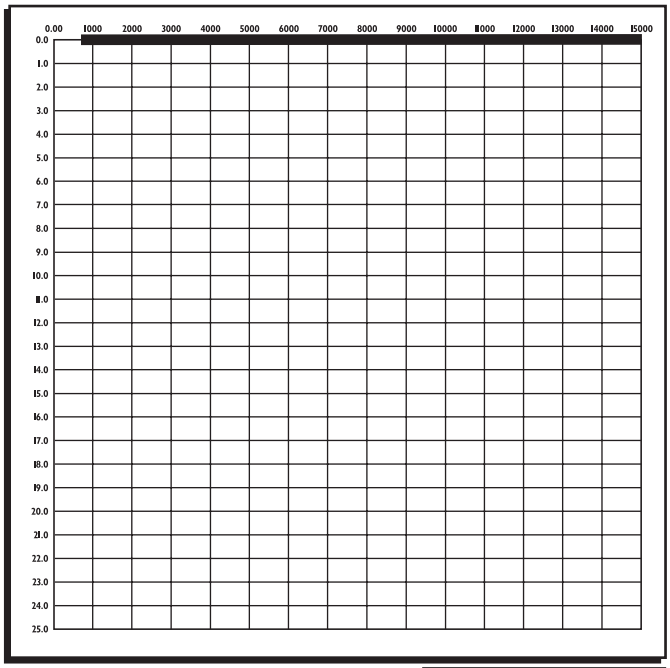
StepOffDelay – (Default .50 Seconds)
The Step Off Delay feature is active when any of the step retards (3-Step Retards or Launch Retard) are deactivated. This option will provide a time delay from 0 to 2.50 seconds in .010 second increments before the timing returns to normal. This ensures that any Nitrous has stopped flowing before the timing returns to normal.

LAUNCH TIMING CURVE

LaunchCurve – (Default - See Graph)

The MC-4 allows you to program a timing curve that is only active when you are in first gear. When this curve is active the word active appears on the bottom of this graph. This curve is programmable by the graphical map.



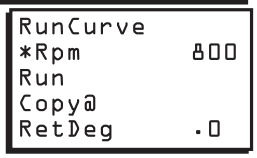


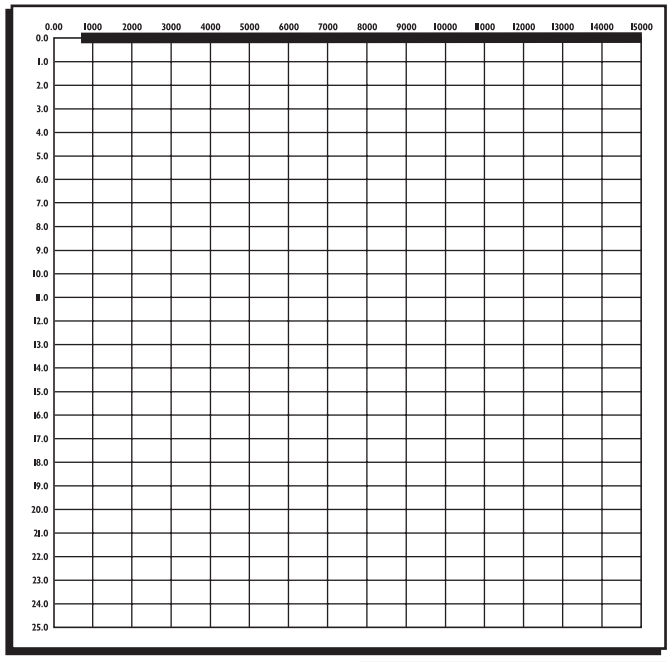
The easiest way to achieve this is to maximize the box that contains the Launch Curve. In order to move the curve you will need to place your mouse over the portion of the graph that you would like to move. Right click your mouse and select “Add Dot”. This will give you a red dot that you will be able to position anywhere along the curve. Continue to do this until your curve is completely mapped out. After this curve has been edited, save it in the MC-4 with a transfer - Plot to MSD or File-Save As to save it in a file on the PC.

RUN TIMING CURVE

RunCurve – (Default - See Graph)

The MC-4 gives you the ability to map out a complete timing curve from 800 rpm all the way to 15,000 rpm. This timing curve can increase or decrease at any point along the graph.





The easiest way to achieve this is to maximize the box that contains the Run Timing Curve. In order to move the curve you will need to place your mouse over the portion of the graph that you would like to move. Right click your mouse and select “Add Dot”. This will give you a red dot that you will be able to position anywhere along the curve. Continue to do this until your curve is completely mapped out. After this curve has been edited, save it in the MC-4 with a transfer - Plot to MSD or File-Save As to save it in a file on the PC.

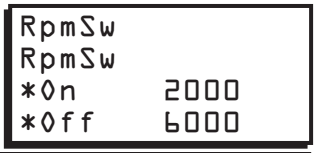
Note: Any graph can be printed by selecting Transfer-Print. Also all other parameters can be printed from the Data Editor-Select-Print.

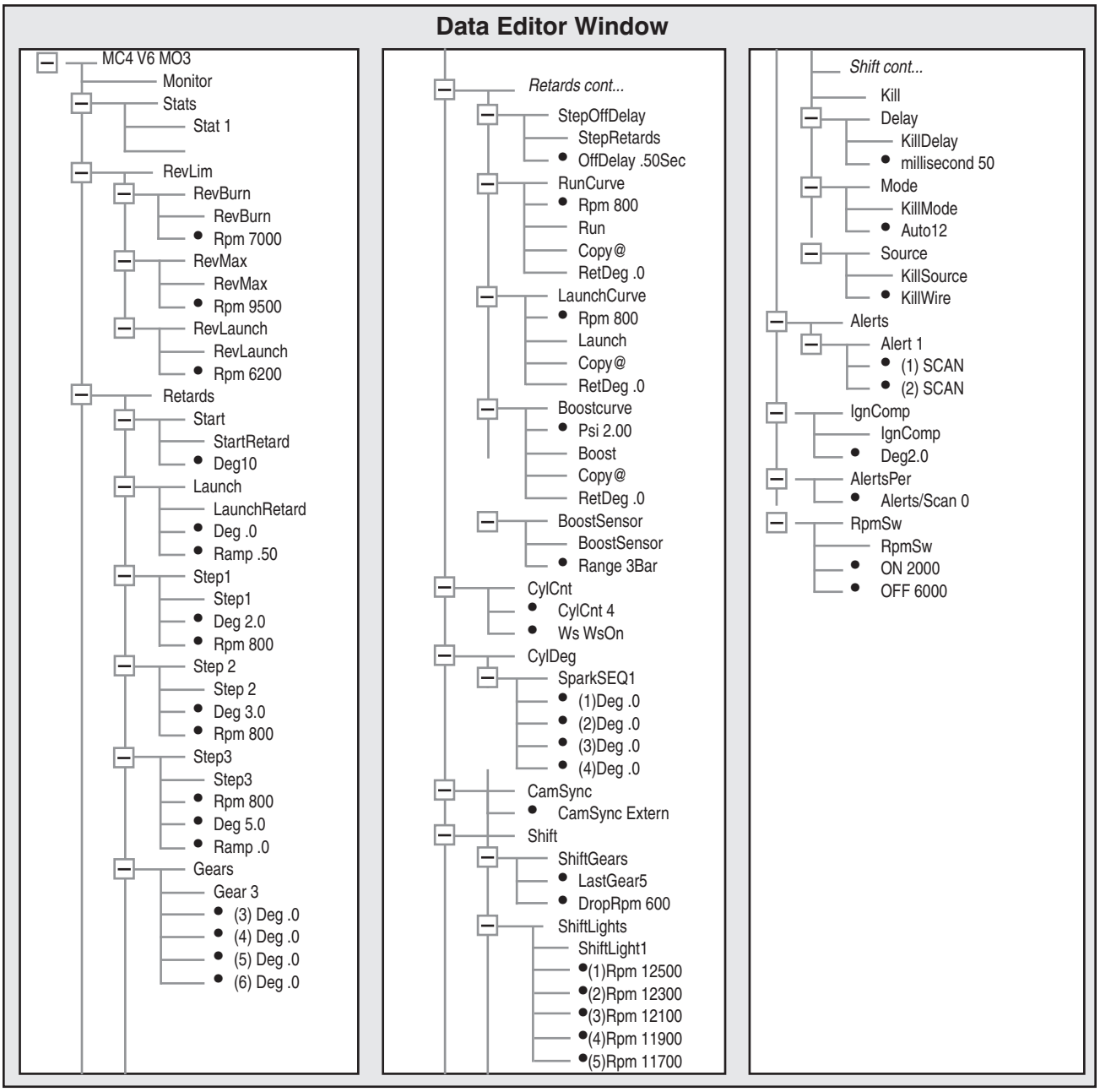
RPM ACTIVATED WINDOW SWITCH

RPMSW – (Default - On: 2,000 RPM; Off: 6,000 RPM)

This feature will supply ground to the Purple/Blue wire when the On rpm value is reached, then it will remove the ground when the Off rpm value is reached. This wire will handle a maximum 3 Amp continuous draw.

The options are: ON 2,000 - 15,000 in 100 rpm increments
OFF 2,000 - 15,000 in 100 rpm increments





ALERTS

Alerts – (Default - (1) Scan - (2) Scan)
The alerts will provide a flash code to the LED on the outside of the MC-4.

Alert 1 - This is the No Cam Sync Alert. This will blink the LED twice.
Alert 2 - This indicates a Low Battery situation. This will blink the LED three times.

The Options are: Scan (to enable)
Skip (to disable)

Note: In order to use the LED on the MC-4 to static time your engine you must turn all alerts off (Skip).

DEFAULT SETTINGS AND ADJUSTMENTS

The following list shows all of the default values and adjustable increment of the MC-4 Ignition.

Display	Default	Data Low-High (step by)
ShiftLt1 ###00 Rpm	12,500	2,000-15,000 (100)
ShiftLt2 ###00 Rpm	12,300	2,000-15,000 (100)
ShiftLt3 ###00 Rpm	12,100	2,000-15,000 (100)
ShiftLt4 ###00 Rpm	11,900	2,000-15,000 (100)
ShiftLt5 ###00 Rpm	11,700	2,000-15,000 (100)
LastGear #	5	2-6
RevBurn ###00 Rpm	7,000	2,000-15,000 (100)
RevLaun ###00 Rpm	6,200	2,000-15,000 (100)
RevMax ###00 Rpm	9,500	2,000-15,000 (100)
RetStart ## Deg	10	00-25
Retard1 ##.# Deg	2.0	0-15.0 (.1)
Retard2 ##.# Deg	3.0	0-15.0 (.1)
Retard3 ##.# Deg	5.0	0-15.0 (.1)
Retard1 ###00 Rpm	800	800-15,000 (100)
Retard2 ###00 Rpm	800	800-15,000 (100)
Retard3 ###00 Rpm	800	800-15,000 (100)
StepOffDelay#.##	.50	0-2.50 (.01)
RetLaun ##.# Deg	0.0	0-15.0 (.5)
RampTim #.## Sec	.50	0-2.50 (.01)
Spark1 #.# Deg	0	0-5.0 (.1)
Spark2 #.# Deg	0	0-5.0 (.1)
Spark3 #.# Deg	0	0-5.0 (.1)
Spark4 #.# Deg	0	0-5.0 (.1)
CylCnt $	4	1/2/4
Ws $$$$$$	WsOn	WsNone/WsOff/WsOn
DropRpm ##00	600	500-1500 (100)
RunCurve Rpm ###00	800	800-15,000 (100)
RunCurve Deg ##.#	0	0.0-25.0 (.1)
LaunchCurve Rpm ###00	800	800-15,000 (100)
LaunchCurve Deg ##.#	0	0.0-25.0 (.1)
BoostCurve Psi##.##	2.0	2.0-45.0 (.25)
BoostCurve Deg ##.#	0	0.0-25.0 (.1)
BarType #Bar	3	2-3
AlertsPer #	0	0-1
RpmSw On	2000	2000-15,000 (100)
RpmSw Off	6000	2000-15,000 (100)
Gear3 Retard Deg #.#	0	0.0-5.0 (.1)
Gear4 Retard Deg #.#	0	0.0-5.0 (.1)
Gear5 Retard Deg #.#	0	0.0-5.0 (.1)
Gear6 Retard Deg #.#	0	0.0-5.0 (.1)
ShiftKillMode $$$	Auto12	Auto12/Auto123/Manual
ShiftKillTime ##msec	50	20-99 (1millisecond)
CamSync $$$$$$	Extern	Extern/Chan1
Step3 Ramp	0	0-9.9 (.1 sec)
KillSource	KillWire	KillWire/ShiftLight
RpmDrop	600	500-1500 (100)
IgnComp	2.0	0-3.0 (.5 deg)
Alert 1	Scan	Scan/Skip
Alert 2	Scan	Scan/Skip

TECH NOTES

INSTALLATION INSTRUCTIONS

TECH NOTES

Service

In case of malfunction, this MSD component will be repaired free of charge according to the terms of the warranty. When returning MSD components for warranty service, **Proof of Purchase** must be supplied for verification. After the warranty period has expired, repair service is based on a minimum and maximum fee.

All returns must have a Return Material Authorization (RMA) number issued to them before being returned. To obtain an RMA number please contact MSD Customer Service at 1 (888) MSD-7859 or visit our website at www.msdperformance.com/rma to automatically obtain a number and shipping information.

When returning the unit for repair, leave all wires at the length in which you have them installed. Be sure to include a detailed account of any problems experienced, and what components and accessories are installed on the vehicle. The repaired unit will be returned as soon as possible using Ground shipping methods (ground shipping is covered by warranty). For more information, call MSD at (915) 855-7123. MSD technicians are available from 7:00 a.m. to 5:00 p.m. Monday - Friday (mountain time).

Limited Warranty

MSD warrants this product to be free from defects in material and workmanship under its intended normal use*, when properly installed and purchased from an authorized MSD dealer, for a period of one year from the date of the original purchase. This warranty is void for any products purchased through auction websites. If found to be defective as mentioned above, it will be repaired or replaced at the option of MSD. Any item that is covered under this warranty will be returned free of charge using Ground shipping methods.

This shall constitute the sole remedy of the purchaser and the sole liability of MSD. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representation whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall MSD or its suppliers be liable for special or consequential damages.

*Intended normal use means that this item is being used as was originally intended and for the original application as sold by MSD. Any modifications to this item or if it is used on an application other than what MSD markets the product, the warranty will be void. It is the sole responsibility of the customer to determine that this item will work for the application they are intending. MSD will accept no liability for custom applications.

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